We claim:

1. A carboxy(C_1-C_3)alkylcellulose ester having the following properties:

a maximum degree of substitution per anhydroglucose unit of from about 3.08 to about 3.50, comprised of the following substitutions:

a degree of substitution per anhydroglucose unit of carboxy(C_1-C_3)alkyl of from about 0.20 to about 1.2,

a degree of substitution per anhydroglucose unit of hydroxyl of from 0 to about 1.0,

a degree of substitution per anhydroglucose unit of C_3-C_4 esters of from about 0 to about 3.30, and

a degree of substitution per anhydroglucose unit of acetyl of from 0 to about 3.30;

an inherent viscosity of 0.05 to 0.18 dL/g, as measured in a 60/40 (wt./wt.) solution of phenol/tetrachloroethane at 25 °C;

a number average molecular weight (M_n) of from about 1,000 to about 7,000;

a weight average molecular weight of from about 1,500 to about 23,000; and

a polydispersity of from about 1.20 to about 7.0.

2. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and wherein the C_3-C_4 ester comprises butyryl at a degree of substitution of from about 0.01 to about 0.66.

3. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and

wherein the C_3-C_4 ester comprises butyryl at a degree of substitution of from about 0.58 to about 1.15.

4. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and wherein the C_3-C_4 ester comprises butyryl at a degree of substitution of from about 1.00 to about 1.69.

5. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and wherein the C_3-C_4 ester comprises butyryl at a degree of substitution of from about 1.45 to about 2.27.

6. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and wherein the C_3-C_4 ester comprises butyryl at a degree of substitution of from about 2.20 to about 3.25.

7. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and wherein the C_3-C_4 ester comprises propionyl at a degree of substitution of from about 0.01 to about 0.66.

8. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and wherein the C_3-C_4 ester comprises propionyl at a degree of substitution of from about 0.58 to about 1.15.

9. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and

wherein the C_3-C_4 ester comprises propionyl at a degree of substitution of from about 1.00 to about 1.69.

10. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and wherein the C_3-C_4 ester comprises propionyl at a degree of substitution of from about 1.45 to about 2.27.

11. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and wherein the degree of substitution per anhydroglucose unit of acetyl is from about 1.95 to about 2.68.

12. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and wherein the degree of substitution per anhydroglucose unit of acetyl is from about 1.34 to about 2.02.

13. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester, and wherein the degree of substitution per anhydroglucose unit of acetyl is from about 2.65 to about 3.25.

14. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester having an acid number of from about 40 to about 200 mg KOH/g sample.

15. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester having an acid number of from about 40 to about 75 mg KOH/g sample.

16. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester having an acid number of from about 75 to about 105 mg KOH/g sample.

17. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester having an acid number of from about 105 to about 200 mg KOH/g sample.

18. The carboxy(C_1-C_3)alkylcellulose ester according to claim 1, wherein the degree of substitution per anhydroglucose unit of hydroxyl is from about 0 to about 0.90.

19. The carboxy(C_1-C_3)alkylcellulose ester according to claim 1, wherein the degree of substitution per anhydroglucose unit of hydroxyl of from about 0.1 to about 0.9.

20. The carboxy(C_1-C_3)alkylcellulose ester according to claim 5, wherein the ester forms a clear solution as a 10 weight percent mixture in diisobutyl ketone.

21. The carboxy(C_1-C_3)alkylcellulose ester according to claim 15, wherein the ester forms a clear solution as a 10 weight percent mixture in diisobutyl ketone.

22. The carboxy(C_1-C_3)alkylcellulose ester according to claim 5, wherein the ester forms a clear solution as a 10 weight percent mixture in a 70/30 mixture of toluene/ethyl acetate.

23. The carboxy(C_1-C_3)alkylcellulose ester according to claim 15, wherein the ester forms a clear solution as a 10 weight percent mixture in a 70/30 mixture of toluene/ethyl acetate.

24. The carboxy(C_1-C_3)alkylcellulose ester according to claim 5, wherein the ester forms a clear solution as a 10 weight percent mixture in methyl amyl ketone.

25. The carboxy(C_1-C_3)alkylcellulose ester according to claim 15, wherein the ester forms a clear solution as a 10 weight percent mixture in methyl amyl ketone.

26. The carboxy(C_1-C_3)alkylcellulose ester according to claim 5, wherein the ester forms a clear solution as a 10 weight percent mixture in ethyl acetate.

27. The carboxy(C_1-C_3)alkylcellulose ester according to claim 15, wherein the ester forms a clear solution as a 10 weight percent mixture in ethyl acetate.

28. The carboxy(C_1-C_3)alkylcellulose ester according to claim 5, wherein the ester forms a clear solution as a 10 weight percent mixture in n-butyl propionate.

29. The carboxy(C_1-C_3)alkylcellulose ester according to claim 15, wherein the ester forms a clear solution as a 10 weight percent mixture in n-butyl propionate.

30. The carboxy(C_1-C_3)alkylcellulose ester according to claim 5, wherein the ester forms a clear solution as a 10 weight percent mixture in n-butyl acetate.

31. The carboxy(C_1-C_3)alkylcellulose ester according to claim 15, wherein the ester forms a clear solution as a 10 weight percent mixture in n-butyl acetate.

32. The carboxy(C_1-C_3)alkylcellulose ester according to claim 5, wherein the ester forms a clear solution as a 10 weight percent mixture in n-propyl propionate.

33. The carboxy(C_1-C_3)alkylcellulose ester according to claim 15, wherein the ester forms a clear solution as a 10 weight percent mixture in n-propyl propionate.

34. The carboxy(C_1-C_3)alkylcellulose ester according to claim 5, wherein the ester forms a clear solution as a 10 weight percent mixture in propylene glycol monopropyl ether.

35. The carboxy(C_1-C_3)alkylcellulose ester according to claim 15, wherein the ester forms a clear solution as a 10 weight percent mixture in propylene glycol monopropyl ether.

36. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose ester.

37. The carboxymethylcellulose ester of claim 36, wherein the degree of substitution per anhydroglucose unit of hydroxyl is from 0.10 to

0.90, the degree of substitution of butyryl is from 1.10 to 2.55, and the degree of substitution of acetyl is from about 0.10 to 0.90.

38. The carboxymethylcellulose ester of claim 36, wherein the degree of substitution per anhydroglucose unit of hydroxyl is from 0.10 to 0.90, the degree of substitution of butyryl is from about 2.04 to about 2.22, and the degree of substitution of acetyl is from about 0.42 to about 0.59.

39. The carboxy(C_1-C_3)alkylcellulose ester of claim 1, wherein the inherent viscosity is from 0.07 to 0.13 dL/g.

40. The carboxy(C1-C3)alkylcellulose ester of claim 1, wherein the number average molecular weight (M_n) is from 1,500 to 5,000.

41. The carboxy(C_1-C_3)alkylcellulose ester according to claim 39, wherein the degree of substitution per anhydroglucose unit of hydroxyl is from 0.10 to 0.90, the degree of substitution of butyryl is from 1.10 to 2.55, and the degree of substitution of acetyl is from 0.10 to about 0.90.

42. The carboxy(C_1-C_3)alkylcellulose ester according to claim 1, wherein the carboxy(C_1-C_3)alkylcellulose ester is a carboxymethylcellulose acetate propionate having a degree of substitution per anhydroglucose unit of propionyl of from about 0.05 to about 3.30, a degree of substitution per anhydroglucose unit of acetyl of from 0 to about 2.00, and a degree of substitution per anhydroglucose unit of butyryl of from 0 to about 1.00.

43. The carboxymethylcellulose ester of claim 18, wherein the degree of substitution per anhydroglucose unit of hydroxyl is from 0.10 to 0.90, and the degree of substitution of acetyl is from about 1.95 to about 2.68.

44. The carboxymethylcellulose ester of claim 18, wherein the degree of substitution per anhydroglucose unit of hydroxyl is from 0.10 to 0.90, and the degree of substitution of acetyl is from about 1.34 to about 2.02.

45. The carboxy(C_1-C_3)alkylcellulose ester according to claim 44, wherein the inherent viscosity is from 0.07 to 0.13 dL/g.

46. The carboxymethylcellulose acetate according to claim 44, wherein the number average molecular weight (M_n) is from 1,500 to 5,000.

47. A coating composition, comprising:

a) from about 0.1 to about 50 weight percent, based on the total weight of (a) and (b) in the coating composition, of the carboxy(C_1-C_3)alkylcellulose ester according to claim 1;

b) from about 50 to about 99.9 weight percent, based on the total weight of (a) and (b) in the composition, of at least one resin selected from the group consisting of a polyester, a polyester-amide, a cellulose ester, an alkyd, a polyurethane, an epoxy resin, a polyamide, an acrylic, a vinyl polymer, a polyisocyanate, and a melamine; and

c) at least one solvent;

wherein the total weight of (a) and (b) is from about 5 to about 85 weight percent of the total weight of (a), (b), and (c).

48. The coating composition according to claim 47, further comprising about 0.1 to about 15 weight percent, based on the total weight of the composition, of one or more coatings additives selected from the group consisting of leveling, rheology, and flow control agents; flatting

agents; pigment wetting and dispersing agents; surfactants; ultraviolet (UV) absorbers; UV light stabilizers; tinting pigments; defoaming and antifoaming agents; anti-settling, anti-sag and bodying agents; anti-skinning agents; anti-flooding and anti-floating agents; fungicides and mildewcides; corrosion inhibitors; thickening agents; or coalescing agents.

49. The coating composition according to claim 47, wherein the inherent viscosity of the carboxyalkylcellulose ester is from 0.07 to 0.11 dL/g.

50. A coating composition, comprising:

a) from about 0.1 to about 50 weight percent, based on the total weight of (a) and (b) in the coating composition, of the carboxyalkylcellulose ester according to claim 37;

b) from about 50 to about 99.9 weight percent, based on the total weight of (a) and (b) in the composition, of at least one resin selected from the group consisting of a polyester, a polyester-amide, a cellulose ester, an alkyd, a polyurethane, an epoxy resin, a polyamide, an acrylic, a vinyl polymer, a polyisocyanate, and a melamine; and

c) at least one solvent;

wherein the total weight of (a) and (b) is from about 5 to about 85 weight percent of the total weight of (a), (b), and (c).

51. The coating composition according to claim 50, further comprising about 0.1 to about 15 weight percent, based on the total weight of the composition, of one or more coatings additives selected from the group consisting of leveling, rheology, and flow control agents; flatting agents; pigment wetting and dispersing agents; surfactants; ultraviolet (UV) absorbers; UV light stabilizers; tinting pigments; defoaming and antifoaming

agents; anti-settling, anti-sag and bodying agents; anti-skinning agents; anti-flooding and anti-floating agents; fungicides and mildewcides; corrosion inhibitors; thickening agents; or coalescing agents.

52. The coating composition according to claim 50, wherein the inherent viscosity of the cellulose ester is from 0.07 to 0.11 dL/g.

53. A shaped or formed article coated with the composition of claim 7.

54. A shaped or formed article coated with the composition of claim 50.

55. A pigment dispersion, comprising:

the carboxy(C_1-C_3)alkylcellulose ester according to claim 1; and

about 20 to 50 weight percent by weight of a pigment.

56. The pigment dispersion of claim 55, wherein the pigment is comprised of alumina or mica.

57. A radiation curable coating containing the carboxy(C_1-C_3)alkylcellulose ester according to claim 1.

58. A radiation curable coating containing the carboxy(C_1-C_3)alkylcellulose ester according to claim 37.

59. A powder coating containing the carboxy(C_1-C_3)alkylcellulose ester according to claim 1.

60. A powder coating containing the carboxymethylcellulose ester according to claim 37.

61. An ink composition containing the carboxy(C_1-C_3)alkylcellulose ester according to claim 1.

62. An ink composition containing the carboxymethylcellulose ester according to claim 37.

63. A waterborne coating composition comprising:

(a) from about 0.1 to about 50 weight percent, based on the total weight of (a) and (b), of the carboxy(C_1-C_3)alkylcellulose ester according to claim 1, wherein at least about 25 percent of the carboxyl groups have been neutralized with ammonia or an amine;

(b) at least 50 weight percent, based on the total weight of (a) and (b), of a compatible water soluble or water dispersible resin selected from the group consisting of polyesters, polyester-amides, cellulose esters, alkyds, polyurethanes, epoxy resins, polyamides, acrylics, vinyl polymers, polyurethanes, and melamines;

(c) water; and

(d) an organic solvent ;

wherein the total weight of (a) and (b) is between 5 and 50 weight percent of the total composition and the organic solvent comprises less than 20 weight percent of the total weight of the composition.

64. A waterborne coating composition comprising:

(a) from about 0.1 to about 50 weight percent, based on the total weight of (a) and (b), of the carboxymethylcellulose ester according to

claim 37, wherein at least about 25 percent of the carboxyl groups have been neutralized with ammonia or an amine;

(b) at least 50 weight percent, based on the total weight of (a) and (b), of a compatible water soluble or water dispersible resin selected from the group consisting of polyesters, polyester-amides, cellulose esters, alkyds, polyurethanes, epoxy resins, polyamides, acrylics, vinyl polymers, polyurethanes, and melamines;

(c) water; and

(d) an organic solvent ;

wherein the total weight of (a) and (b) is between 5 and 50 weight percent of the total composition and the organic solvent comprises less than 20 weight percent of the total weight of the composition.